

Take your time on this step it is worth taking an extra couple of hours to make sure that everything is secured and installed correctly than lose your new airplane.

## CG LOCATION

We suggest starting out with the CG set at the wing Joiner. This is a good starting point for the first couple of flights on your plane. After you become comfortable with how it flies you can move the CG around to your liking. You can also search on some of the popular bulletin boards on the internet to see where other pilots have there CG set.

## RECOMMENDED THROWS

Here are some points for the control throws. Do not use 3d settings until you have flown the plane several times and are familiar with the planes low rates. The 3D rates are intended to extreme aerobatics.

Surface Area	High Rate (3D)	Low Rates
<b>Ailerons:</b>	30+ deg	18 deg
<b>Elevators:</b>	40+ deg	18 deg
<b>Rudder:</b>	40 deg	25 deg

If you are in doubt about your skills, ask an experienced pilot to help you with a trainer cord.

## BEFORE YOU FLY FOR THE FIRST TIME

Take a few minutes to re-check each servo and make sure all screws are in place and snug. We recommend you use metal gear servos , place one drop of thread locker on the screws that hold the arms on the servos. Re-check all control horns, and all linkages for slop or looseness. This would greatly increase that chances of flutter and could destroy your airplane. This is a 3D Aerobatic airplane with large surfaces. Be careful to keep everything tight and control your speed when flying.

Before or after every flight you should go over the plane and check hinges, prop, spinner, control linkages, and bolts. This will only make your plane last longer and ensure your safety and the others around you.

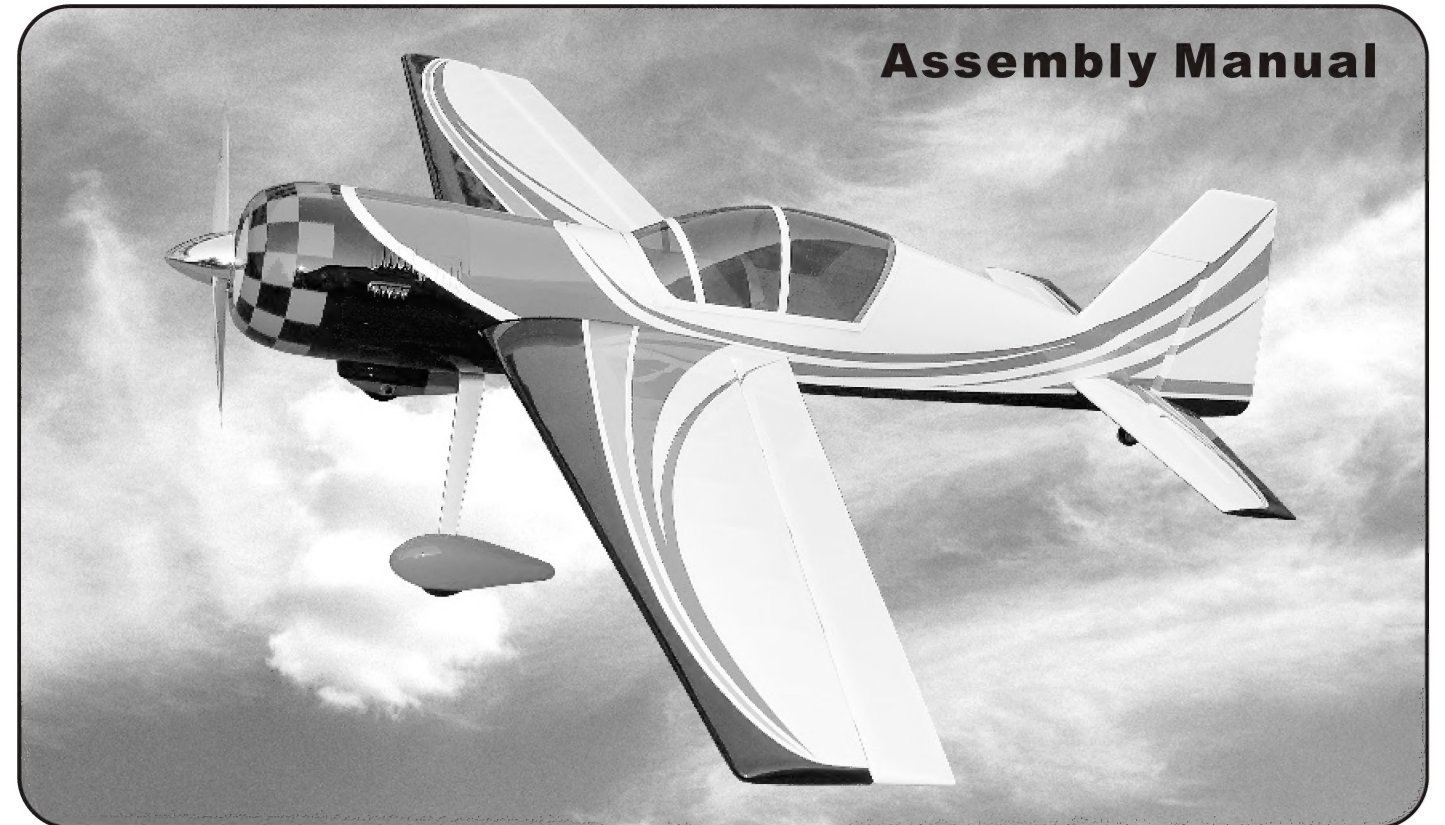
### Checklist:

- Stab Bolts
- Wing Bolts
- Servo Connections Going the right direction
- Prop
- Spinner
- Control Horns
- Linkages
- Rudder Cable
- Canopy Bolts
- Loose Covering



# YAK 54

## Assembly Manual



ITEM	DESCRIPTION	WING SPAN	LENGTH	WING AREA	WEIGHT	ENGINE
<b>No.4630</b>	YAK 54 30%	87"(2210mm)	75.5" (1918mm)	1411 sq.in. (91dm <sup>2</sup> )	16 lbs. (7.3kg)	50cc
<b>No.4631</b>	YAK 54 33%	95"(2410mm)	89.3" (2268mm)	1742 sq.in. (112dm <sup>2</sup> )	19.5~22.5 lbs. (10.2kg)	75~80cc
<b>No.4632</b>	YAK 54 35%	107"(2718mm)	95.0" (2413mm)	2223 sq.in. (143dm <sup>2</sup> )	30.0 lbs. (13.6kg)	100cc
<b>No.4633</b>	YAK 54 37.5%	121"(3073mm)	108.5" (2756mm)	2854 sq.in. (184dm <sup>2</sup> )	37.5 lbs. (17.0kg)	150cc
<b>No.4634</b>	YAK 54 40%	129"(3277mm)	114.5" (2908mm)	3247 sq.in. (209dm <sup>2</sup> )	44.0lbs. (20.0kg)	200cc

## Warranty

This kit is guaranteed to be free from defects in material and workmanship at the date of purchase. It does not cover any damage caused by use or modification. The warranty does not extend beyond the product itself and is limited only to the original cost of the kit. By the act of building this user-assembled kit, the user accepts all resulting in liability for damage caused by the final product. If the buyer is not prepared to accept this liability, it can be returned new and unused to the place of purchase for a refund. Neither your dealer nor Thunder Tiger Distributors, can accept kits for return if construction has begun.

## Notice: Adult Super Vision Required

This is not a toy. Assembly and flying of this product requires adult supervision.

Read through this book completely and become familiar with the assembly and flight of this airplane. Inspect all parts for completeness and damage. Browse [www.thundertiger.com](http://www.thundertiger.com) for customer service if you encounter any problems.



INTRODUCTION

Thank you for choosing the Thunder Tiger TOC Yak 54. We have put great effort into making this the best plane you will ever build and fly. We wish you great success in the assembly and flight of your TOC Yak 54.

The TOC series is bringing a new level of pre-fabrication into the ARF market. We have done most of the hard work for you to get you into the air quicker. Before you begin construction of your new TOC Yak 54 we recommend that you open and inspect everything even if there is not visible damage from shipping.

You encounter any problem, please contact authorized distributor for after service. User in North America may contact Ace Hobby Distributors, Inc. Directly as following information for after service.

26021 Commoncentre  
Lake Forest, CA 92630  
Custom Service: (866) 322-7121  
Phone: (949) 900-3300  
Fax: (949) 900-3301  
Website: [www.acehobby.com](http://www.acehobby.com)  
Email: [Rocky@acehobby.com](mailto:Rocky@acehobby.com)

WARNING

An R/C aircraft is not a toy! If misused can cause serious bobily harm and property damage. Fly only in open areas, and AMA (Academy of Model Aeronautics) approved flying sites in North America.

Academy of Model Aeronautics.  
5161 E. Memorial Dr.  
Muncie IN 47302  
Tel: (800) 435-9262  
Fax: (765) 289-4248

USING THIS MANUAL

When you start a construction section, it is a good idea to first read that entire section before cutting, drilling, or gluing. For example, if you are about to begin the section called “Mounting the Engine”, read that entire section before doing anything else. Reading the entire section will give you a good feel of where you are headed and the options available.

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THROTTLE SERVO INSTALLATION

Gather the following parts:

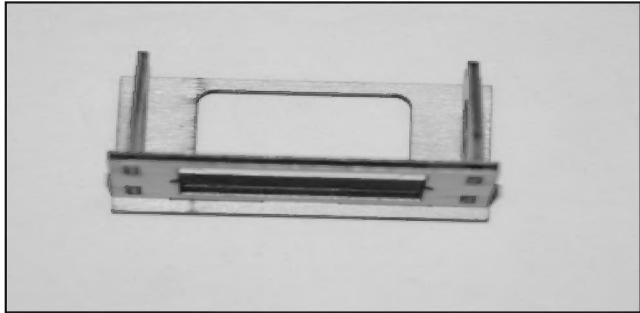
- Throttle Servo
- Servo Extensions
- Servo Screws
- Thin C/A
- Servo Arm
- Throttle Servo Linkage
- 2- 4-40 Ball Link Sets

Tools Required:

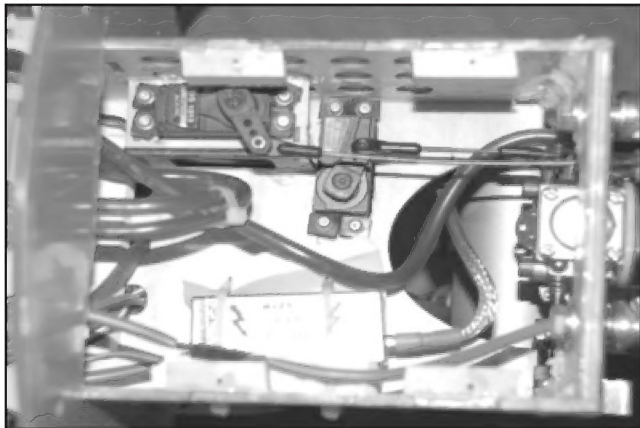
- Drill and Drill Bits
- Allen Wrench for Servo Screws

The first step is to locate the throttle arm and whole location for your throttle linkage drill this first. Then where you are going to install your servo. We chose to use the supplied servo mount to install our throttle servo.

You will need to assemble the servo mount and glue it together. Locate the proper spot for the throttle servo per your setup to have a clean and linear setup.



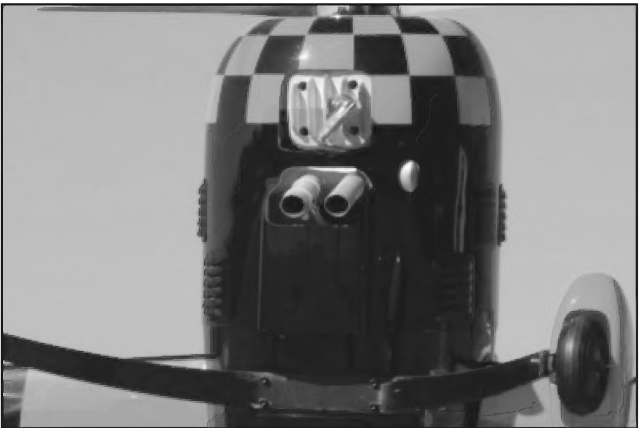
33.Glue the throttle servo mount to the location you picked out per your throttle linkage. Install your servo to the mount per the manufacturer's specifications.



34.You can also see that a choke servo has been installed . This is not necessary but is a easy to turn on a off the choke. You can also see that ignition has been mounted in the motor box.

Cowl Installation and Cooling

The cowl assembly is pretty straightforward. We will walk you through the assembly and the installation of standard mufflers. Install the mufflers if you have not already done so. Tape a piece of paper to the bottom of the fuselage, trace the location of the mufflers to the paper and cut those locations out. Remove the mufflers and mount the cowl to the fuselage, trace the marks you made onto the bottom of the cowl. Use a dremel to cut out the muffler locations. Verify you have enough clearance around the mufflers to be able to remove and install the cowl. This is a completed picture of the cowl with the standard mufflers installed.

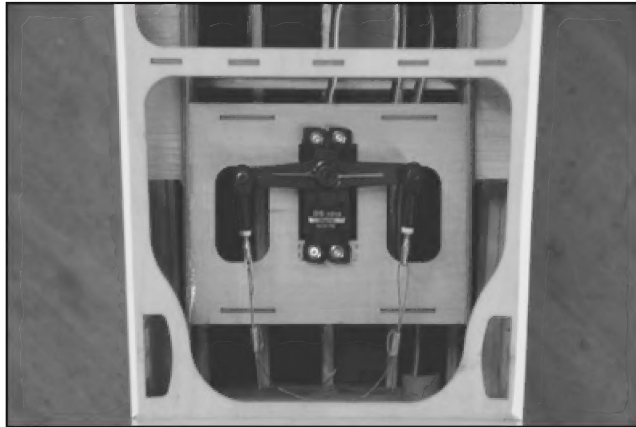


RADIO GEAR INSTALLATION

You have almost completed the assembly of the Thunder Tiger Yak 54. The final step is to install your radio gear. We will not cover this section of the assembly but will provide you with some pointers. Do not install your batteries until you have everything else installed on your plane including the receivers. Once you have everything installed in your plane, put the plane together including wings, stabs, canopy, prop, and spinner. Check the CG at the point specified in this manual. Use the batteries to adjust the balance in the plane to obtain CG as per this manual. Use some sort of battery redundancy with 2 batteries of at least 5200 Mah each. Install all gear per the manufactures specifications. Place foam underneath all batteries, receivers, and all electronic devices. Secure all electronic devices with Velcro straps or Zip Ties. You can check some of the popular r/c bulletin boards to get additional setup information.



28. Now we will install the rudder servo rack . You may want to wait till the very end to glue the rack in plane. This is for CG purposes. You will need the rudder servo tray and the two rails that, attach to the bottom use thin CA to assemble these parts. as shown .



29. You may need to trim the servo bay depending on what servo you use. Next we will install the tray in the plane with the servo installed . You can see that a aftermarket. Arm has been used for added strength.

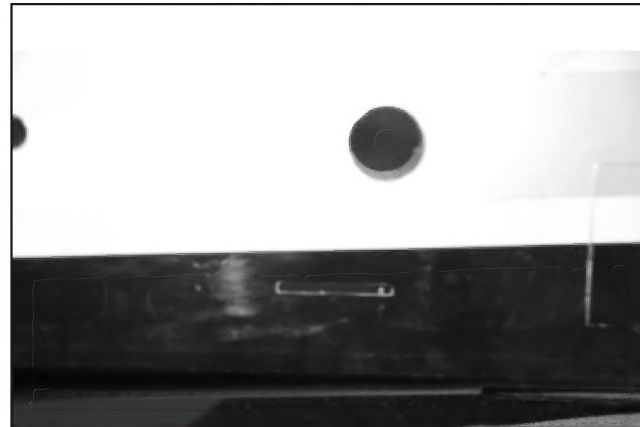
## PULL/PULL ASSEMBLY

### Gather the following parts:

- Pull/Pull Wire
- Hardware related to pull/pull

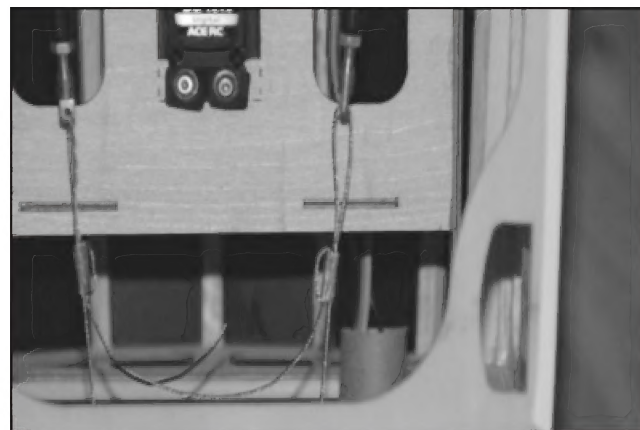
### Tools Required:

- Pliers to cut and crimp cable
- Thin C/A
- X-Acto Knife



31. Locate the pull/pull exit holes located in the fuse. Use a sharp x-acto knife to cut the covering away from these exits.

Guide the cable through these holes and into the fuse where the rudder servos are located.



32. Complete the assembly as shown in the above picture. When crimping the cable with the brass tube that is included make sure you fish the cable through the crimp at least 2 times. After you crimp the brass tube use some thin C/A for a little extra security.

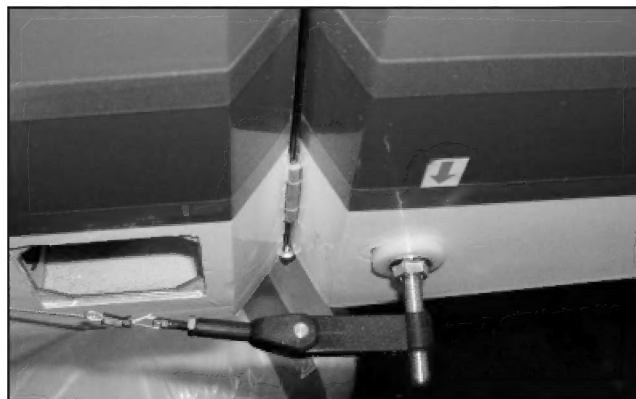
Center the rudder and use a piece of blue tape to hold the rudder at center.

Power up your rudder servo(s) and make sure they are centered.

Make the same assembly as you did earlier in this section and attach to your rudder servos.

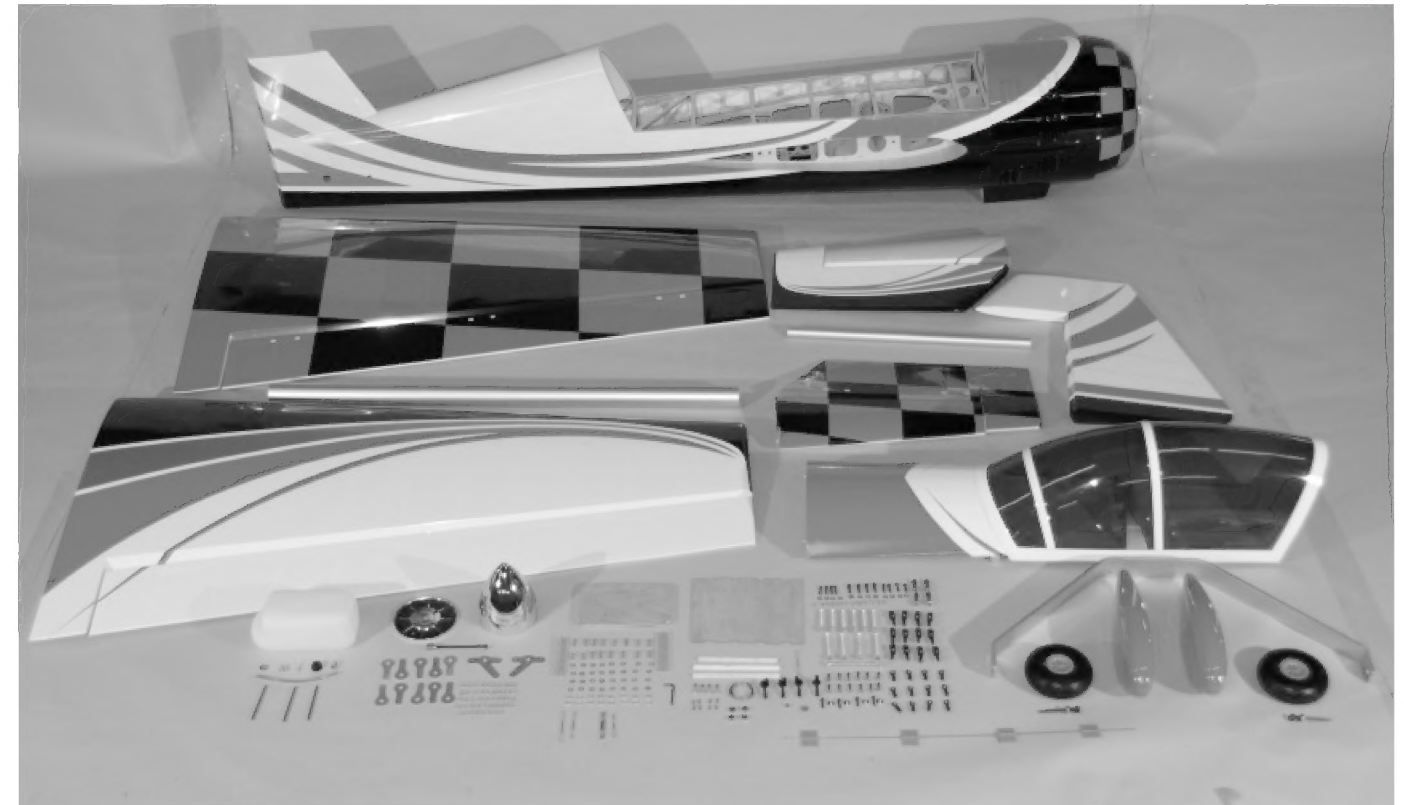
Tension the rudder servo wires and guide through the eyelets on the 4-40 bolts that you attached to the rudder servo(s).

## RUDDER CONTROL HORN INSTALLATION



30. For the rudder control horn installation you will now drill the second hole to counter sink the head of the control horn. During installation you will need to make sure that the control horn is even on both ends.

**TIP:** Do not forget to put thread locker all of the nuts on the control horn linkage.



Exploded parts shown.

## KIT CONTENTS

- Left Wing Half VS Aileron
- Right Wing Half VS Aileron
- Rudder
- Fuselage
- Aluminum main gear
- Rubber wheels
- Fiberglass Wheel pants
- Aluminum wing and stab tubes
- Control horns with 4-40 Ball Links
- Complete hardware package with SAE bolts and nuts
- Aluminum Spinner
- Canopy and Hatch

## NECESSARY TOOLS

- Hand Held Drill
- Drill Press
- Drill Bits
- Allen Wrenches
- Pliers
- Socket or Wrench Set
- X-Acto Knife
- Covering Iron or Heat gun
- 30 min epoxy
- 5 min epoxy
- Zap ca thin
- Zap-a-Gap CA +

## NECESSARY EQUIPMENT

**Engine:** 50cc Engine of your choice

**Servos:** 6 Digital High Torque Servos

**Landing Gear:** Tail Wheel of your choice

**Servo Extensions:**

- 3-6"
- 2-12"
- 2-36"

Remember this is based upon your setup. You will need to determine your actual quantities of items needed. Based on the components that you use .



## SHRINKING AND TIGHTING COVERING (DO NOT SKIP THIS STEP)



1. When you first open the crate for the aircraft there may not be any wrinkles in the covering. Please take the time to go over all of the seams and covering. This ensures all seams will be tight and secure during 3D or IMAC flying.



2. Use a heat gun and iron to go over all of the covering. If bubbles show up you can use a small needle to puncture the bubble and then iron it down. On a multi layer area make sure to only puncture the top layer.

## LANDING GEAR INSTALLATION

### Gather the following parts:

- Main Gear
- Tail Gear (Not included in the kit)
- Screws for tail gear (Not included in the kit)
- 4- 8-32 x 1" Allen Bolts
- 4- 8-32 Lock Nuts
- Wheels
- Axles
- Wheel Collars
- Wheel Pants
- (4) 4-40 Allen bolts and blind nuts for wheel pants

### Tools Required:

- Allen wrench for 8-32 Bolts
- Blue Loc-tite
- Wrench for 8-32 Nuts



3. First cut the covering off the bottom of the plane where the four bolts and nylon lock nuts will be used to attach the landing gear.

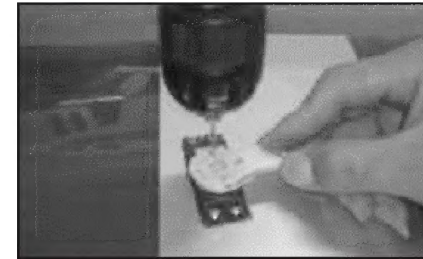


4. Install the wheel axels as shown. Make sure and use loc-tite and the threads.

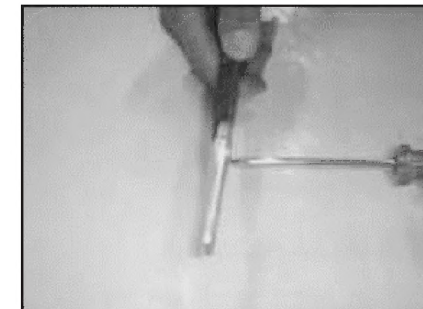


5. To install the wheel pants drill a hole that is big enough to go over the axle nut. Then you will need to install the wheel pants after you install the axels. The wheel pants are held on with 2-4-40 bolts and blind nuts. We recommend using a little bit of silicone between the landing gear and the wheel pant to help reduce vibration.

23. Double check that your servos are centered and there is no sub trim in the radio. Now place the metal servo arm on top of the wheel making sure arm is parallel with control surface. Mark hole position on servo wheel.



24. Using a 2mm drill bit, drill four holes through the servo wheel. (You may choose to purchase some metal after-market servo wheels or arms for added strength. If after-market arms are used, they should be 1-1/2" long.



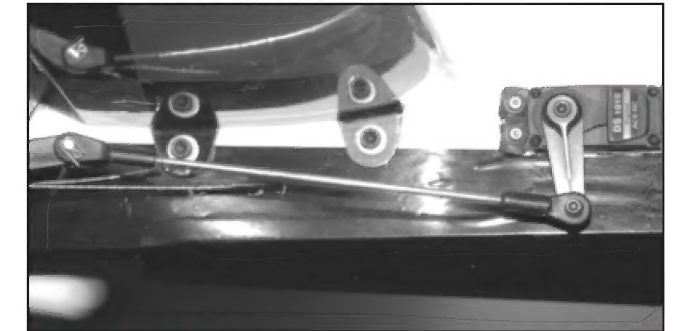
25. Once the four holes are drilled, install the metal arm to the wheel using the screws supplied with the kit.

Finally install the assembly to the servo. Use thread locker to make sure your servo arm does not fall off.

**You now can attach the servo horn to the control surfaces. It is important to attach the horn so it centers over the hinge line as in the photo below. Once you have gotten the position you want drill the holes put a small amount of thin ca in the holes and the put in screws.**



26. Attach the horns on the elevator control surface in the same manner. With the horn spaced one inch from the fuse.



27. Now fin the servo bay and cut out the covering as in the aileron step. And install one servo in each side of the fuse.

## RUDDER SERVO INSTALLATION

(pull/pull install under control horns)

### Gather the following parts:

- 3- High Torque Digital Servos or 1 Seiko Servo
- Servo Extensions
- Control Horns, and servo linkages for rudder
- 12- Servo Screws
- Thin C/A

### Tools Required:

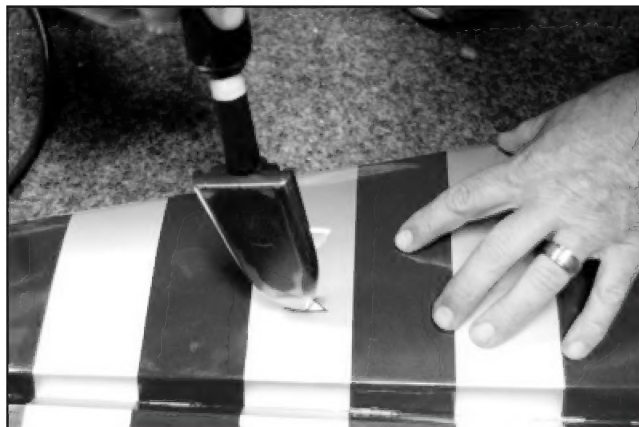
- Drill
- Drill Bits
- Allen Wrench or Screw Driver for Servo Screws







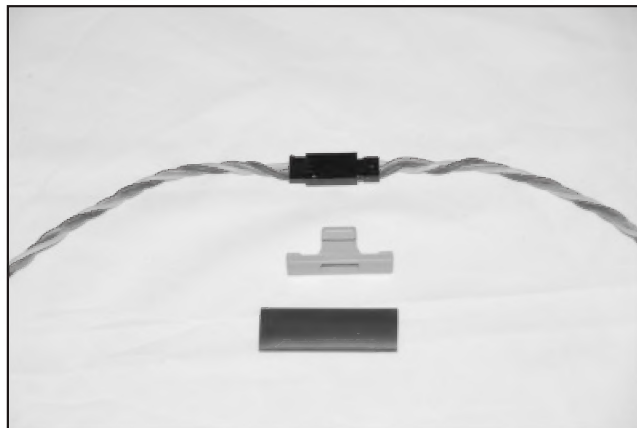
19. First thing is to cut the servo bay opening out. We decided to leave the covering in place and iron it down this will eliminate the covering from lifting or coming off in flight.



20. Use your iron to iron down the covering into the servo bay, some minor trimming of the covering may be necessary.



21. The above is a completed picture. You can trim the covering in the servo bay. Repeat this step on all of your servo bays.



22. Next you will install the servos, the outboard servo will need a 6" extension installed on the servo wire. On our installation we used heat shrink to join the servo extension to the servo wire. We also used a plastic sleeving to go over the servo wires to protect them from chafing. See figures below.

Use a piece of blue tape to connect the end of the servo connector to the string installed in the servo bay. Pull gently on the end of the string by the root rib of the elevator. This will fish the servo wire through all of the ribs. Afterwards secure the end of the extension in the elevator so it does not fall back in. Repeat this for the wings and other elevator half.

## SERVO ARM ASSEMBLY

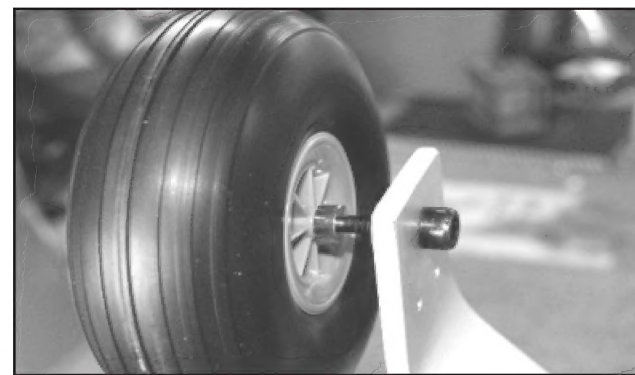
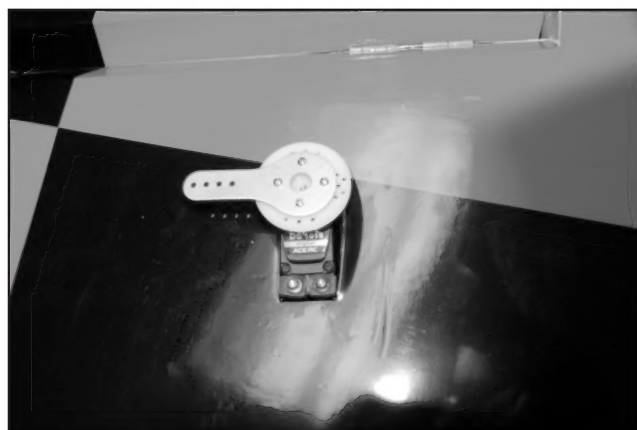
Gather the following parts:

- Kit supplied servo arms
- Round servo disc arms (supplied with servos)
- Screws (supplied with kit)

Tools Required:

- Drill and drill bits
- Screw driver
- Thread locker

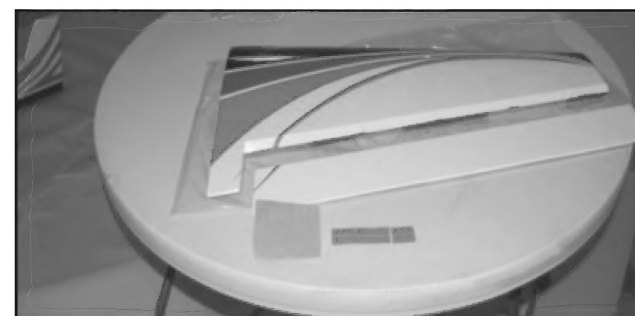
This will walk you through the assembly of the kits supplied servo arms



6. Install the tires included in the kit with the wheel collars that are supplied in the hardware package. Center the tire in the wheel pants and tighten down the wheel collars. Also once the wheel is centered in the wheel pant we suggest you grind a flat on the axle to prevent collar movement. Don't forget to put loc-tite on the wheel collar set screws.

Shown without wheel pants for detail

## HINGE INSTALLATION



7. A needle oiler is suggested to oil the hinge so the glue does not glue the hinge line. A petroleum jelly can also be used.



8. Sand the hinges so the glue will adhere well. Next glue the hinge to the wing side and allow the glue to dry. Repeat the process on the aileron now.



9. Do the same process on the horizontal stabilizer for all hinges.

## ENGINE INSTALLATION

This plane is compatible with any 50cc engine on the market. We used the DA 50cc engine for our installation.

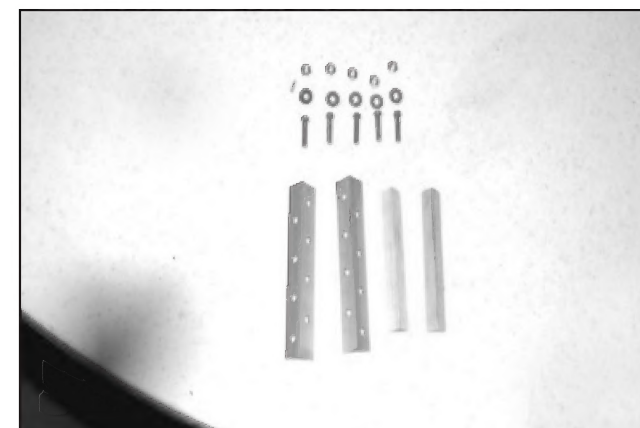
Gather the following parts:

- 50cc Engine
- Mounting Hardware (not included with kit)

Tools Required:

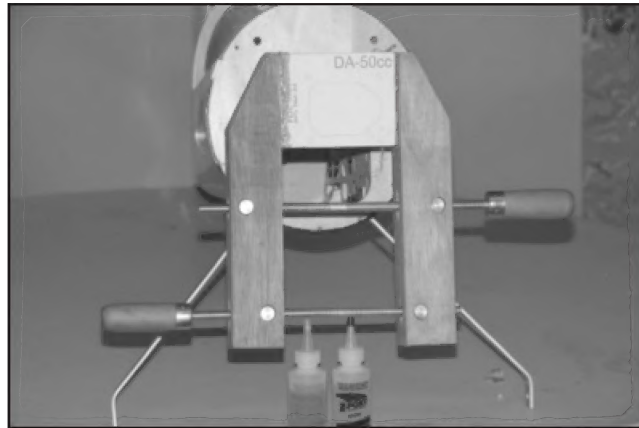
- Drill and Drill Bits
- Sanding Block
- Ruler
- Pencil
- Allen Wrench for Engine Mounting Hardware
- Thread locker
- 30 min Epoxy

## FIREWALL INSTALLATION



10. Locate the firewall parts provided as shown includes triangle stock, angle iron, nuts, washers, and bolts.





11. You will need to calculate the engine box length to determine the cowl length. Place the cowl on a level surface no place a straight edge. Across the top no measure from the bottom of the cowl to the straight edge. Now subtract a quarter inch from that measurement since the mount. Ring is a quarter inch inside the cowl. Now measure your engine. From the rear of the mounting plane to the surface that your prop will rest on.

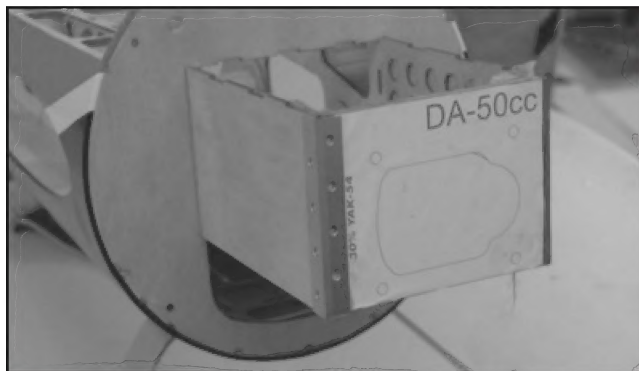
Now test do the calculation.

COWL LENGTH MINUS ENGINE EQUALS ENGINE BOX LENGTH.

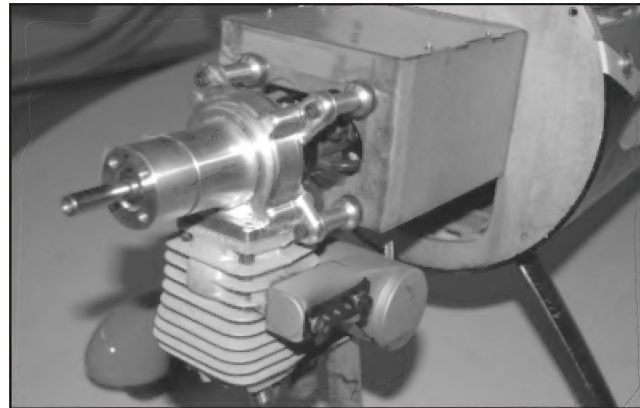
Example  
Cowl length 11.75  
Engine length -5.94  
5.81

Now add .25 for the prop  
And 6.06 is the length

We would set our fire wall at 6 - 1/16<sup>th</sup>  
Now we can install the fire wall with 30min epoxy and the triangle stock .Once the firewall is glued in place with the triangle stock clamp and allow to dry.



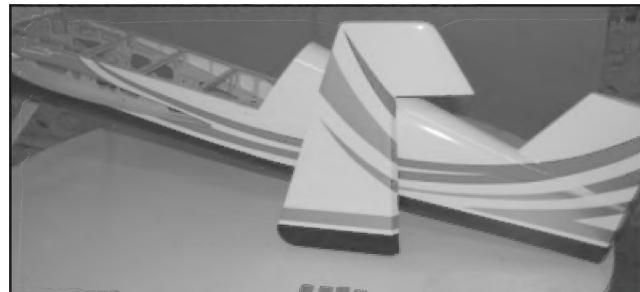
12. Once the glue is dry you can install the angle iron with nuts and bolts provided. You can also put on the engine template with a small amount of spray adhesive so it can be peeled of at a later time.



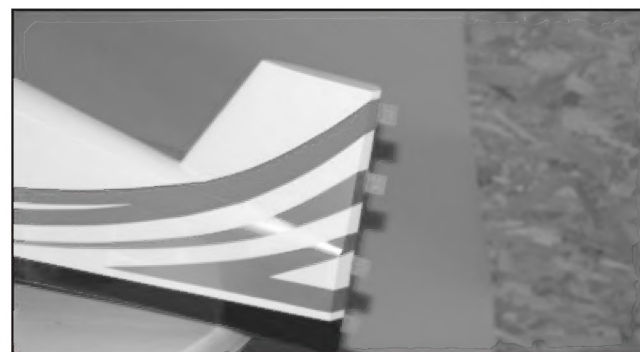
13. You cut out may vary depending on what engine you are using. Now is time to cut out for the carb. You can see we are mounting a DA 50. It is done with a rotary tool and a cutting bit. Now mark the center of your engine bolt holes with a ice pick or a spring loaded center punch. Also depending on what engine you use you may need standoff as in the picture below.

**Congratulations you have now mounted your engine.**

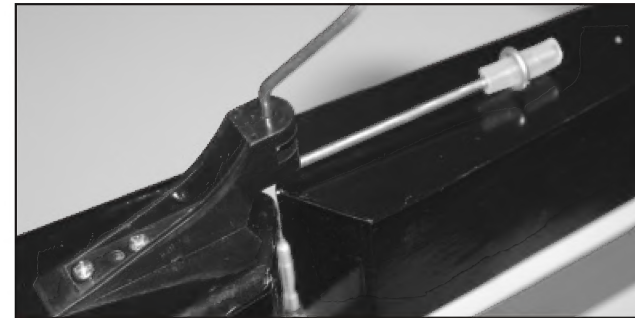
## RUDDER INSTALLATION



14. Oil the hinge as you did for the aileron and glue hinge into the fuselage.



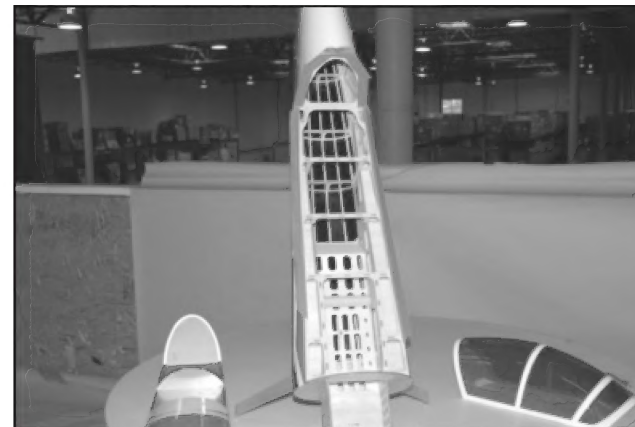
15. Allow them to dry and glue on the rudder. While the rudder is drying this is a good time to attach the tail gear.



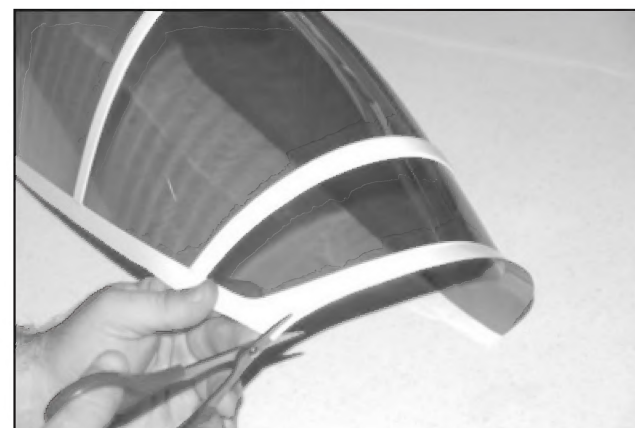
16. Install tail gear which comes with 30% YAK-54. For 33% up to 40%, user has to prepare the tail gear of his choice and follow the instruction to install the tail gear. Make sure the tail gear is rated for the plane otherwise the tail gear may fail and cause loss of control and loss of aircraft or damage to property or people.

Thunder Tiger provides optional carbon tail wheel bracket for your. (No.3660 for 30~33%, No.3661 for 35%~40%)

## CANOPY ASSEMBLY



17. Apply tape or wax paper to the fuse as shown.



18. Now trim the canopy on the molded line with lexan scissors.



19. Now apply your favorite glue . We use Zap a Dap a Goo.



20. Attach the hatch to the fuse with screws provided this will allow the best fit of the canopy to the hatch .

Now apply a 1/8<sup>th</sup> bead of glue to the canopy slightly then open the canopy and position it in the hatch tape down with blue tape and allow drying over night.

## SERVO AND ELECTRONICS INSTALLATION

We will cover the installation of the elevator servos in detail. For the wing servos will tell you what extensions you need and the rest is the same as the elevators.

### Gather the following parts:

- 6- High Torque Digital Servos (2- Elevator, 2-Wings, 1-Rudder)
- 24 Servo Screws
- Servo Arms (supplied with kit)
- Thin C/A
- Heat shrink 3/8" to 1/2"
- Servo Extensions (need lengths)

### Tools Needed:

- X-acto Knife
- Iron (for covering)
- Tape
- Heat Gun
- Drill
- Drill Bits